Report on:

ASHRAE Winter Meeting

January 25-30, 1992

Anaheim, CA

Reported by:

Larry C. Holcomb

Holcomb Environmental Services

17375 Garfield Rd.

Olivet, Michigan

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The ASHRAE annual winter meeting was held January 25-30 in Anaheim, California. There was a great variety of events of interest with regard to IAQ. These were 1) Technical sessions and forums and 2) Technical Committees, and Special Committees.

This report will be an attempt to summarize what is going on at these meetings and what may be important in the way of follow-up discussions.

I. Technical Sessions and Forums

A. Pros and Cons of Using CO_2 as a General Indicator of IAQ

Moderator Dr. Gemma Kerr - Chemist, Public Works, Ottawa, Canada
Dr. Kerr emphasized that forums are meant to encourage comments from all interested parties without publicly announcing the results to the press, etc.

Dick Groat and Graham Newell both gave short presentations.

Dick Groat - High CO_2 indicates a problem. If above 600-700 ppm, it may indicate the start of a problem. One needs to be careful about instrumentation.

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Graham Newell - He is modeling IAQ in buildings using CO_2 as a possible method in controlling ventilation rates. Sometimes it works; sometimes it does not.

Discussion:

There is much variation in reliability of the equipment. There are good units. One commentor reported infra-red units have significant drift. The good units usually cost more. Another commentor: infra-red units are fine. Where and when the concentration is measured is important.

Art Wheeler - Design engineer. Curing SBS is not a design objective. Trying to get a reliable indicator of CO_2 and using it as such for air flow rates will be accomplished, if not already accomplished.

Graham Newell - If you have high recirculation rates, CO_2 is a better indicator because air is better mixed.

Bud Offerman - Good instruments are available; relatively cheap. Many other persons commented. Among them was Hal Levin and Andy Persilly (from NIST) who commented on development of on ASTM practice for measurement of CO_2.

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B. IAQ Technical Session

Air Cleaning Strategies for equivalent IAQ R. Raber and H.H.S. Yu., Farr Co., El Segundo, CA. This paper shows use of a model to predict filtration needs to meet Std. 62-1989. Dependent on outdoor air conditions, ventilation rates, etc., filter efficiency (percent removal) is predicted. Holcomb asked that Yu send him a copy of his paper. He agreed to do so.

C. Seminar - Design Professional's Services, Liability Issues, and Indoor Air Quality, IV. Chairman, Hal Levin.

ASHRAE - Seminars are held on topics of current issues.

Helen Eisenstein - Simke, etc., attys. Los Angelos, CA. She writes Indoor Air Pollution Law Report.

Cases in the past were largely asbestos-related or single sources of contamination (formaldehyde, radon, etc.). Now SBS-Type cases from commercial office building, schools, etc. The web of liability reaches very far. Individuals, class actions, building tenants, etc. file suits. Target defendants are building owner, architect, engineer and building management. Cases brought on negligence (must meet applicable ASHRAE stds.); strict liability.

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Gerald Weisbach, Natkin, etc., architect and atty. San Francisco. Mr. Weisback reported that one should describe services you expect to render; communicate it explicitly. Generally, problems include lighting and acoustics, too. If the job can't be done right, don't do it.

Hal Block, Natkin, etc., architect and atty. People have claimed physical injury for exposure to low level VOC's. Expert witness; very few true experts in the world. They do not have credibility or expertise. Define Std. of Care in your contract. Very important to have documentation.

David W. Lakamp - Risk Management Prof. Practice Insur. Broker, Inc., Port of Redwood City, CA. As literature is published documenting changes (risks, etc.,) the professional liability changes. Prof. liability insurance covers consequences of negligence (failure to meet recognized stds. of professional care). Std. of care is changing dramatically.

He says that pollution control liability exclusion for prof. liability insurance has been taken care of in the last year or year and a half. Also, cost has gone down. C and A Insurance has become a leader in this field.

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D. Seminar - In Place Filter Testing - TC 2.4 Matt Klein, OSHA, Chairman

Dave Ensor, RTI, Do lab. experiments and field tests allow one to predict filter efficiency?

Particle counters, quartz-crystal micro-balancer, etc., for measurement were used in an office building. They had trouble getting flow rates; leaks, etc. RTI has developed an indoor air quality model. This uses sinks, air flow rates, leakage, generation from sources, etc. and is now available from NIST. Holcomb has requested information on ordering this.

Dr. Ensor showed a chart of "Experimental Compared to Predicted" concentrations of particulates. With an 85% ASHRAE filter the concentrations were predicted to be considerably reduced. The building actually had a 30% ASHRAE filter and the actual measured conc. was considerably less than the predicted value.

Hal Levin suggested that total mass does not indicate indoor air quality. I suspect that Hal is worried about the impact of small RSP's from ETS.

Mark Kryzamowski - Bellcore

Particle Count Measurements Upstream and Downstream of Filters.

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Bellcore accomplished small scale sampling but in many buildings. They used optical particle counters.

With 95% Filtration they reported

87% removal >0.5 um

99% removal >1.0 um

86% removal 0.5-1.0 um

Loading of filters for too long can result in unloading or particle release, i.e., very poor efficiency of removal.

Generally, their filtration was removing 62 percent or so of particles 0.5 um or greater. Fan cycling dramatically impacts particles removed because air is no longer moving through the filter when the fan is off.

Bob Raber, FARR Co. The investigators looked at three sites in the field using a portable laser counter with a printer. They then tested the same filter in the lab. using white light. Filter efficiency under these two conditions were similar. There was a difference in particle counts using white light or portable laser counters. Flow rates up and downstream are almost impossible to measure.

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Tom Kuehn, U. of Minnesota. Filter removal efficiency as related to bioaerosols. Although virus particles are small, they may be attached to droplets of larger size. Dr. Kuehn gave an excellent presentation on sampling and evaluation techniques.

In all of these presentations, filtration efficiency below 0.5 um generally not shown. Electronic precipitation will take out some of the 0.2 micron particles. Probably 95 percent efficiency will take some of the 0.2 um (tobacco size particles) out. It will be important to look at dose, not just particle numbers. However, if we look at particle numbers and size, these small particles may be of some benefit for reducing things like radon risk.

II. Special Committee

A. SSPC 62 ASHRAE Committee on Standard 62, Chairman Gene Tucker, U.S. EPA. There are many members on this committee: some voting and some non-voting members. Currently, there are no non-voting corresponding members but this is a possibility for the future. Of the 25 persons names, about 16 persons were present. Mr. Daynard and Dr. Samet were not present but were hooked up by telephone for the proceedings.

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The chairman is trying to get 4-5 active subcommittees that will report back to the full committee. The committee will meet again at the June 25-30, 1992 ASHRAE summer meeting in Baltimore. Interested persons will get mailings but not necessarily all documents.

Ole Fanger reported on the status of the European ventilation std., (Commission of the European Convention)

Fanger says that old ventilation std. procedures are out. They are looking at 62-1989 considering health and comfort. Use of perceived air quality of 10, 20 or 30 percent dissatisfied.

Pollution load is caused by smoking, physical exercise and children. Also, pollution loads from buildings. Olf/m^2. is 0.02 - 1.32 in different buildings.

$$Q = \frac{G}{C_i - C_o} \cdot \frac{1}{E_v}$$

Q = Required Ventilation Rate

G = Pollution Load

Ci = Air Quality Indoors

Co = Air Quality Outdoors

Ev = Ventilation Effectiveness

Questions of Fanger from John Samet on Carcinogens: how do you deal with them? Answer; some warnings; source control. How does European system deal with Sensitive Individuals? - Very little database. Phil Morey asked about viruses and endotoxins and received a very nebulous response.

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The chairman then went through a list of potential areas for revisions of ASHRAE Std. 62. Health and Comfort Subcommittee; John Samet has been named chairman. Michael Hodgson commented that it is difficult to decide how to deal with sensitive people. Hal Levin suggested there needs to be a distinction between Sensitive vs. Susceptible populations. Larry Holcomb commented on the possible difference between comfort/odors, irritants and health effects. Thus, the committee will need to address these issues carefully and with expertise. He gave an example of total VOC's versus analysis of effect of individual VOC's.

Source Control and Air Cleaning

Phil Morey addressed Micro-Organisms; there is a need for more guidance in the std. Daynard commented that they may need a special committee to deal with particulates, etc., from tobacco smoke.

John Jansen commented on toxicity associated with tobacco smoke compared with outdoor ambient particles and a need to differentiate between the two.

The IAQ Procedure

There was some discussion of this that blended in with other areas and subcommittees.

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Energy Impacts

Committee 90.2 deals with energy. Larry Holcomb commented that if this committee deals with costs of energy then it should also deal with savings due to benefits. The committee can assess energy costs but any comments on this should address both costs and benefits.

Residential Ventilation

A std. is a std. for both offices and residences, etc. but a special subcommittee may address residential separately.

Editorial Changes

Generally they believe they need a subcommittee for this because of ambiguities that can occur in definitions, etc.

Ventilation Effectiveness

Perhaps need better definition.

Going Beyond Design

Operation and maintenance guidance needs to be included in the std.

Discussion of Priorities

Jim Woods commented that there is an issue of compliance with the std. A special commissioning committee may deal with this. Gene Tucker kept pushing the idea of source control as these sources are impacted by ventilation that includes air cleaning.

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Michael Sherber volunteered to be the chairman of Energy subcommittee.

Bud Offerman volunteered for some work on Sources and Air Cleaning.

Volunteers for Health and Comfort Subcommittee: Samet, chairman; Cain, Fanger, Daynard, Fickes, Hodgson, Ninomura, Ting, Tucker. Subcommittee - IAQ procedure, Art Weaver, Chairman.

Follow-up

Non-members of the committee can serve on subcommittees according to Gene Tucker.

1. Contact Gene Tucker to get all information as it relates to Committee activities. Names and addresses of all voting and non-voting members. Ask to be supplied with all documentation. Ask to be made a member of the Subcommittee on Health and Comfort.
2. Contact Jonathan Samet, Chairman of the Comfort and Health Subcommittee - Ask to participate on the sub-committee.
3. Hal Levin has been appointed chairman of the new GPC-10 committee on "Criteria for achieving Acceptable Indoor Environments". Talk to Hal Levin about appt. to GPC-10.

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Main Environmental Health, Committee - Kevin Teichman, Chairman

IAQ '92 Subcommittee

Michael Hodgson, Chairman

This meeting dealt largely with looking over abstracts submitted for IAQ '92. The American College of Toxicology has asked if the ASHRAE IAQ Committee wants to jointly sponsor a meeting or part of a meeting. The Subcommittee agreed to not do this at upcoming IAQ '92 but to encourage them to participate. One hundred sixty nine abstracts were received and scored for IAQ '92.

Research Subcommittee - Bud Offerman, Chair

Items:

Air Pollution Sources and HVAC Systems - No. 1 priority

School IAQ - No. 2 priority

Building Operation and Maintenance - No. 3

Nine different items were discussed

Six proposals from vendors were reviewed for priority no. 1 ; not voted on yet.

Handbook Subcommittee

Larry Berglund, Chairman. A draft is now available for the Handbook Chapter on Envir. Health. Holcomb asked for a copy to review. There are sections on VOC's, RSP's, radon, Bioaerosols; about 80 double-spaced pages. The chairman needs comments by Feb. 29th. This will require thorough review. ETS is not now in the

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chapter according to Michael Hodgson but he and Larry Berglund intend to talk about it.

Program Subcommittee

There is a topic planned for the Chicago meeting, January, 1993 for how to meet requirements of disabilities act for "sensitive persons". Dr. James Cohen was putting this together.

C. TC 2.4

TC 2.4 John Sabelli, Chairman, Standard Subcommittee for Particulate Contaminant Removal Equipment Committee. Most of the people on this subcommittee are from air filter companies. Handout was distributed for agenda items.

52.2 MOT - Long Range Planning

This committee is just developing and there were no details.

Projects

Guideline, Auditing of Indoor Air Particulates, Mark Krzyzanowski

They want to have guidelines for monitoring IAQ. They should probably be aware of the ASTM activities. Holcomb talked to him. He will be sending some information for participation on this subcommittee.

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Guideline, contaminant control doing construction, M. Klein: perhaps planning a seminar for Chicago; Jan., 1993; uncertain.

Guidelines, Installation and Maintenance of Air Filters - M. Klein Seminar for Baltimore meeting; uncertain. Guidelines, Installation and maintenance of Air Filters - M. Klein Seminar for Baltimore meeting.

There was a big discussion on the need for a guideline for Selection of Filters based on a December 30, 1991 letter from Tom Ottney.

D. TC. 2.3 - Gasous Air Contaminants/Removal Equipment
Research Subcommittee report was handed out. - G.Kerr, Chairman (Canada) Research projects were prioritized for evaluation of gas phase air cleaning equipment. One of the projects (CO-sponsored with TC 2.4 on particulates) was "Investigate and Identify Particulates and VOC's that cause Eye Irritations".

Handbook Subcommittee
Chapter 11 and 12 on odors and air contaminants is being revised for the Handbook.

Art McGiver, Std. Subcommittee Chairman
SPC 129 on Ventilation Effectiveness, is developing a Std.

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Program Subcommittee

"Psychological Response to Offactory Stimulus"

Frank Daylor of Philip Morris suggested a Seminar for Denver in the Summer, 1993. Perhaps he should be contacted for participation or help with the seminars.

E. TC 2.4 - Particulate Air Contaminant Removal Committee , Tom Ottney, Chairman. This committee will meet Sunday from 2 - 4 for Subcommittee work groups at the Baltimore ASHRAE meeting.

Std. Subcommittee - John Sabelli

A liaison established between ASHRAE 2.4 and European CEN. Liaison was also established between ASHRAE 2.4 and Underwriter Labs.

Research Subcommittee - Jim Milum

TC 2.4 A project statement for "Inves. and Identify Indoor Allergies and Biological Toxins that can be removed by filtration" was approved.

2.4.2 - "A Method for Duct Cleaning" work statement was approved.

4.2 625-RP. A project on matching filtration to health requirements was discussed. They are looking largely at removal of algae, fungi, bacteria and viruses through filtration. This looks like a good project. A project status report has been issued as an interim report.

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Program Subcommittee; Allan Frey. A seminar for the January, 1993 Chicago meeting entitled "Concentration of RSP's in Indoor Air as Compared to Standards" was suggested by Larry Holcomb. It was accepted by the group. Holcomb was appointed to chair the seminar and talk to potential speakers, if ASHRAE program committee accepts the proposal. The seminar would probably include four speakers.

Items of Importance and Follow-up

There is need for follow-up on several items as follows:

1. New experts need to become members of ASHRAE, attend meetings and become active in subcommittees and committees. It is very difficult to become an active participant (voting member) without evidence of work on a program and/or subcommittee.

2. Drafts of chapters in the ASHRAE handbook on fundamentals need to be reviewed and commented upon.

3. ASHRAE IAQ '92 needs to be attended. Participation will be important in following years.

4. Modeling for IAQ and filter efficiency performance for both gaseous and particulate phase contaminants needs to be tracked.

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5. IAQ Stds. development in the U.S. and in Europe need to be tracked.

6. Particulate and gaseous phase materials from tobacco smoke need to be kept in perspective. Thus, seminars, etc., need to be proposed to follow-up on the Chicago seminar on RSP's chaired by Holcomb. For example, there should be sessions on:

   a) measurement techniques

   b) actual concentrations vs. stds.

   c) modeled concentrations

   d) health effects as related to dose of exposure, time activity, retained dose, etc.

   e) exposure reduction through use of ventilation and filtration.

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